XP

Journal *of* The Franklin Institute

EDITOR: *Martin A. Pomerantz*

MANAGING EDITOR: *Lillian H. Falgie*

ASSOCIATE EDITORS:

S. D. BEDROSIAN
R. L. BISPLINGHOFF
E. W. BOEHNE
W. J. CUNNINGHAM
A. P. FRAAS
DUNSTAN GRAHAM
JACK K. HALE
T. J. HIGGINS
Y. H. KU
H. G. LEW
LOUIS A. PIPES
R. M. ROSENBERG
JULIUS T. TOU
HSUAN YEH

EMERITUS:

CHARLES B. BAZZONI
PAUL D. FOOTE
C. J. STAUD
HUGH S. TAYLOR

VOL
289
197

The 145th Year of Publication

XP

Journal *of* The Franklin Institute

EDITOR: *Martin A. Pomerantz*

MANAGING EDITOR: *Lillian H. Falgie*

ASSOCIATE EDITORS:

S. D. BEDROSIAN
R. L. BISPLINGHOFF
E. W. BOEHNE
W. J. CUNNINGHAM
A. P. FRAAS
DUNSTAN GRAHAM
JACK K. HALE
T. J. HIGGINS
Y. H. KU
H. G. LEW
LOUIS A. PIPES
R. M. ROSENBERG
JULIUS T. TOU
HSUAN YEH

EMERITUS:

CHARLES B. BAZZONI
PAUL D. FOOTE
C. J. STAUD
HUGH S. TAYLOR

VOL
289
197

The 145th Year of Publication

INDEX TO VOLUME 289

January–June 1970

SUBJECT INDEX

Papers are listed under subject headings with authors' names in parentheses following title of paper. Authors are listed with titles of their papers in alphabetical order in the Author Index. Entries with (BC) are Brief Communications.

A

Algorithm for Liapunov functions. Construction of Liapunov functions (Chen & Kinnen), 133

Algorithms. A practical approach to the chromatic partition problem (Wilkov & Kim), 333

Analysis of differential pulse code modulation systems. Application of the Fokker–Planck–Kolmogorov equation to the analysis of differential pulse code modulation systems (Protonotarios), 31

Analysis of multiports. A matrix operation for analyzing series-parallel multiports (Mitra), (BC), 167

Analytical dynamics. Direct determination of finite rotation operators (Bahar), (BC), 401

Applied mathematics. Direct determination of finite rotation operators (Bahar), (BC), 401

Applied mechanics. A perturbation method as applied to problems of finite elastodynamic deformations (Wang), 361

Approximate minimax prediction. A recursive nonlinear predictor (Mintz), 121

B

Blondel's equation, validity of. Note on the e.m.f. equations of a conventional commutator machine (Ingram), (BC), 395

Book Reviews

Beranger, M. and E. Vogt (edited by): Advances in nuclear physics, Vol. 2, 72

Bloch, F., S. G. Cohen, A. De-Shalit, S. Sambursky and I. Talmi (edited by): Spectroscopic and group theoretical methods in physics, 323

Bunshah, R. F. (edited by): Techniques of metals research, Vol. II, part 2, 172

Chua, L. O.: Introduction to nonlinear network theory, 475

Clark, R. C. and G. H. Derrick (edited by): Mathematical methods in solid state and superfluid theory, 73

Crowe, M. J.: A history of vector analysis: The evolution of the idea of a vectorial system, 238

Eyring, H. and M. S. Jhon: Significant liquid structures, 477

Book Reviews (continued)

Ferguson, E. S.: Bibliography of the history of technology, 324

Flory, P. J.: Statistical mechanics of chain molecules, 71

Galejs, J.: Antennas in inhomogeneous media, 237

Geltman, S.: Topics in atomic collision theory, 479

Goldberg, L. (edited by): Annual review of astronomy and astrophysics, Vol. 7, 477

Henry, H. F.: Fundamentals of radiation protection, 476

Jancel, R.: Foundations of classical and quantum statistical mechanics, 405

Jørgensen, C. K.: Oxidation numbers and oxidation states, 406

Karsa, B. E. F.: Electrical measuring instruments and measurements, 475

Kranzberg, M. and C. W. Pursell, Jr. (edited by): Technology of western civilizations, Vols. I and II, 171

Luikov, A. V.: Analytical heat diffusion theory, 406

Mar, J. W. and H. Liebowitz: Structures technology for large radio and radar telescope systems, 240

Marcus, Y. and S. S. Kertes: Ion exchange and solvent extraction of metal complexes, 478

Nosov, Y. R.: Switching in semiconductor diodes, Vol. 3, 325

Perrin, J. P., M. Denouette and E. Daclin (edited by): Systèmes logiques, Vols. I and II, 326

Pipes, L. A. and S. A. Hovanessian: Matrix computer methods in engineering, 326

Rauch, Sr., H. W., W. H. Sutton and L. R. McCreight: Ceramic fibers and fibrous composite materials, Vol. 3, 71

Somorjai, G. A. (edited by): The structure and chemistry of solid surfaces, 242

Truell, R., C. Elbaum and C. B. Chick: Ultrasonic methods in solid state physics, 173

Wolsky, S. P. and E. J. Zdanuk (edited by): Ultra micro weight determination in controlled environments, 325

Buckling. Stability analysis by matrix decomposition (Rubinstein, Hofmeister & Felton), 433

C

Cauchy's interpolation formula. On Cauchy's interpolation formula and sampling theorems (Wang), (BC), 233

Cesàro summation. Cesàro summation of series in boundary-value problems (Evans), 185

Combinatorial theory. Formulas for the number of trees in certain incomplete graphs (Bedrosian), (BC), 67

Communication networks. Construction of redundant networks with minimum distance (Steffen & Dent), 223

Conduction heat transfer. On the application of perturbation to free-boundary problems in radial systems (Jiji), 281

Correlation function. Measurement error of short term correlation functions of ergodic processes (Wolf), (BC), 469

Covering problem. A practical approach to the chromatic partition problem (Wilkov & Kim), 333

Cylindrical type phase space. Global properties of diffusion processes on cylindrical type phase space (Ku & Sheporaitis), 93

D

D.C. machines, e.m.f. equations. Note on the e.m.f. equations of a conventional commutator machine (Ingram), (BC), 395

Degree realization. Degree realization of undirected graphs in reduced form (Ayoub & Frisch), 303

Diakoptics. Piecewise solutions of electrical networks with coupling elements (Riaz), 1

Dielectric properties. Time-variation of surface charge and dielectric constant of a thermo-electret (Chatterjee, De, Chaudhuri & Banerjee), (BC), 473

Differential equation associated with electromagnetic waves. Differential equation associated with electromagnetic waves in an inhomogeneous medium where $\nabla\varepsilon(\mathbf{r})\cdot\mathbf{E}$ vanishes (Samaddar & Lombardo), 457

Differential equations. On the stability of Hill's equation (Mostaghel & Sackman), 147

Differential games. Differential games on function space (Kuo), 411

Diffusion in a catalyst pore, variational analysis of. Variational analysis of diffusion in a catalyst pore (Parkin & Zahradnik), 427

Diffusion processes. Global properties of diffusion processes on cylindrical type phase space (Ku & Sheporaitis), 93

Dimensional analysis. Dimensional properties of optimal and sub-optimal nonlinear control systems (Fuller), 379

Dynamic instability. Dynamic post-buckling characteristics of circular plates (Ahmad), 57

Dynamic response. Spherical viscoelastic systems in fluid media (Carney, III & Bhattacharya), 369

Dynamic stability. Spherical viscoelastic systems in fluid media (Carney, III & Bhattacharya), 369

E

Elasticity. Direct stress solution of axially nonuniform circular shaft in torsion (Bazaj), 253

Electromagnetic waves in an inhomogeneous medium. Differential equation associated with electromagnetic waves in an inhomogeneous medium where $\nabla\varepsilon(\mathbf{r})\cdot\mathbf{E}$ vanishes (Samaddar & Lombardo), 457

E.m.f. equations of commutator machines. Note on the e.m.f. equations of a conventional commutator machine (Ingram), (BC), 395

F

Flow between concentric cylinders. One-dimensional viscous magnetofluidynamic flow in an annulus (Schweitzer & Soler), 445

Fluid flow. Variational solution of axisymmetric fluid flow in tubes with surface solidification (Bilenas & Jiji), 265

Fluid–structure interaction. Spherical viscoelastic systems in fluid media (Carney, III & Bhattacharya), 369

Fokker–Planck–Kolmogorov equation. Application of the Fokker–Planck–Kolmogorov equation to the analysis of differential pulse code modulation systems (Protonotarios), 31

Fourier series. Cesàro summation of series in boundary-value problems (Evans), 185

Functional analysis. Differential gains on function space (Kuo), 411

G

Graphs. A practical approach to the chromatic partition problem (Wilkov & Kim), 333

Graphs: Incidence matrix. On the nonsingular submatrices of the incidence matrix of a graph over the real field (Chen), 155

Graph theory. Formulas for the number of trees in certain incomplete graphs (Bedrosian), (BC), 67

H

Heat transfer. Variational solution of axisymmetric fluid flow in tubes with surface solidification (Bilenas & Jiji), 265

VOL
289
197

Heat transfer with phase transformation. On the application of perturbation to free-boundary problems in radial systems (Jiji), 281

I

Invariant imbedding. Some numerical aspects of optimal control (Spingarn), 351

L

Large deformation dynamical elasticity. A perturbation method as applied to problems of finite elastodynamic deformations (Wang), 361

Liapunov functions. Construction of Liapunov functions (Chen & Kinnen), 133

M

Magnetohydrodynamics. One-dimensional viscous magnetofluidynamic flow in an annulus (Schweitzer & Soler), 445

Mathematical trees. Formulas for the number of trees in certain incomplete graphs (Bedrosian), (BC), 67

Mathematics. On the stability of Hill's equation (Mostaghel & Sackman), 147

Matrices: Graphs. On the nonsingular submatrices of the incidence matrix of a graph over the real field (Chen), 155

Matrix operation. A matrix operation for analyzing series-parallel multiports (Mitra), (BC), 167

Message-switching networks. Construction of redundant networks with minimum distance (Steffen & Dent), 223

Minimax estimation and Kalman filtering. A recursive nonlinear predictor (Mintz), 121

Minimax estimation and target tracking. A recursive nonlinear predictor (Mintz), 121

N

Network analysis. Piecewise solutions of electrical networks with coupling elements (Riaz), 1

Network design. Construction of redundant networks with minimum distance (Steffen & Dent), 223

Non-convergent series. Cesàro summation of series in boundary-value problems (Evans), 185

Nonlinear control. Dimensional properties of optimal and sub-optimal nonlinear control systems (Fuller), 379

Nonlinear discrete-time systems. Optimal control of nonlinear discrete time systems by mathematical programming (Tabak), 111

Nonlinear programming. Optimal control of nonlinear discrete time systems by mathematical programming (Tabak), 111

Nonlinear sampled data system. On the stability of discrete-systems with hysteretic controllers (Bhaumik & Mahalanabis), 313

Nonlinear vibration. On the zero shift problem of a vertical pendulum (Chuang & Soong), 47

Numerical methods. Some numerical aspects of optimal control (Spingarn), 351

Numerical solutions. Direct stress solution of axially nonuniform circular shaft in torsion (Bazaj), 253

O

Optimal control. Dimensional properties of optimal and sub-optimal nonlinear control systems (Fuller), 379

Optimal control. Optimal control of nonlinear discrete time systems by mathematical programming (Tabak), 111

Optimal control. Some numerical aspects of optimal control (Spingarn), 351

Overload noise in differential pulse code modulation systems. Application of the Fokker–Planck–Kolmogorov equation to the analysis of differential pulse code modulation systems (Protonotarios), 31

P

Perturbation methods. On the application of perturbation to free-boundary problems in radial systems (Jiji), 281

Piecewise solutions of networks. Piecewise solutions of electrical networks with coupling elements (Riaz), 1

R

Random processes. Measurement error of short-term correlation functions of ergodic processes (Wolf), (BC), 469

Random processes: random sampling of. Optimum prefiltering in randomly sampled data systems (Masry), 293

Random vibration. On the zero shift problem of a vertical pendulum (Chuang & Soong), 47

Reactor physics. Collision probability criticality calculations (Hunt), 175

Reactor theory and applications. Collision probability criticality calculations (Hunt), 175

Rotation operators. Direct determination of finite rotation operators (Bahar), (BC), 401

Rotational flow. One-dimensional viscous magnetofluidynamic flow in an annulus (Schweitzer & Soler), 445

S

Sampled data systems. On the stability of discrete-time systems with hysteretic controllers (Bhaumik & Mahalanabis), 313

VOL.
289
1970

3

Sampled data systems: random sampling. Optimum prefiltering in randomly sampled data systems (Masry), 293
Sampling theorems. On Cauchy's interpolation formula and sampling theorems (Wang), (BC), 233
Series-parallel multiports. A matrix operation for analyzing series-parallel multiports (Mitra), (BC), 167
Solid mechanics. Dynamic post-buckling characteristics of circular plates (Ahmad), 57
Solid state electrical properties. Time-variation of surface charge and dielectric constant of a thermo-electret (Chatterjee, De, Chaudhuri & Banerjee), (BC), 473
Stability. On the stability of discrete-time systems with hysteretic controllers (Bhaumik & Mahalanabis), 313
Stability. Stability analysis by matrix decomposition (Rubinstein, Hofmeister & Felton), 433
Stability of differential equations. On the stability of Hill's equation (Mostaghel and Sackman), 147
Stability of nonlinear differential equations. Construction of Liapunov functions (Chen & Kinnen), 133
Stochastic optimal control. An approximate method of stochastic terminal control for nonlinear dynamical systems (Sunahara & Ohsumi), 205
Stochastic processes. Measurement error of short-term correlation functions of ergodic processes (Wolf), (BC), 469
Stress analysis. Direct stress solution of axially nonuniform circular shaft in torsion (Bazaj), 253
Structural mechanics. Stability analysis by matrix decomposition (Rubinstein, Hofmeister & Felton), 433
Superconductivity in Ohmic materials. Thermodynamic properties and superconductivity of Ohmic materials (Wolf), 193

T

Thermodynamic conditions describing the transition temperature of certain kinds of superconductors. Thermodynamic properties and superconductivity of Ohmic materials (Wolf), 193
Thermodynamic properties of materials. Thermodynamic properties and superconductivity of Ohmic materials (Wolf), 193

U

Undirected graphs. Degree realization of undirected graphs in reduced form (Ayoub & Frisch), 303

V

Variational analysis, diffusion in a catalytic pore. Variational analysis of diffusion in a catalyst pore (Parkin & Zahradnik), 427
Variational calculus. Variational solution of axisymmetric fluid flow in tubes with surface solidification (Bilenas & Jiji), 265
Vibration. On the zero shift problem of a vertical pendulum (Chuang & Soong), 47
Vibrations of solids. Dynamic post-buckling characteristics of circular plates (Ahmad), 57

AUTHOR INDEX

Full titles of papers are listed only under first author; all co-authors are cross-referenced.

A

Ahmad, J.: Dynamic post-buckling characteristics of circular plates, 57
Ayoub, J. N. and I. T. Frisch: Degree realization of undirected graphs in reduced form, 303

B

Bahar, L. Y.: Direct determination of finite rotation operators, (BC), 401
Banerjee, K.: *see* Chatterjee, S. D.
Bazaj, D. K.: Direct stress solution of axially nonuniform circular shaft in torsion, 253
Bedrosian, S. D.: Formulas for the number of trees in certain incomplete graphs, (BC), 67
Bhattacharya, B. K.: *see* Carney III, J. F.
Bhaumik, H. and A. K. Mahalanabis: On the stability of discrete-time systems with hysteretic controllers, 313
Bilenas, J. A. and L. M. Jiji: Variational solution of axisymmetric fluid flow in tubes with surface solidification, 265
Carney III, J. F. and B. K. Bhattacharya: Spherical viscoelastic systems in fluid media, 369
Chatterjee, S. D., H. De, K. D. R. Chaudhuri and K. Banerjee: Time-variation of surface charge and dielectric constant of a thermo-electret, (BC), 473
Chaudhuri, K. D. R.: *see* Chatterjee, S. D.
Chen, C.-S. and E. Kinnen: Construction of Liapunov functions, 133
Chen, W.-K.: On the nonsingular submatrices of the incidence matrix of a graph over the real field, 155
Chuang, S. N. and T. T. Soong: On the zero shift problem of a vertical pendulum, 47

VOL
289
197

D

De, H.: *see* Chatterjee, S. D.
Dent, W.: *see* Steffen, M. R.

E

Evans, C. M.: Cesàro summation of series in boundary-value problems, 185

F

Felton, L. P.: *see* Rubinstein, M. F.
Frisch, I. T.: *see* Ayoub, J. N.
Fuller, A. T.: Dimensional properties of optimal and sub-optimal nonlinear control systems, 379

H

Hofmeister, L. D.: *see* Rubinstein, M. F.
Hunt, D. C.: Collision probability criticality calculations, 175

I

Ingram, W. H.: Note on the e.m.f. equations of a conventional commutator machine, (BC), 395

J

Jiji, L. M.: On the application of perturbation to free-boundary problems in radial systems, 281
Jiji, L. M.: *see* Bilenas, J. A.

K

Kim, W. H.: *see* Wilkov, R. S.
Kinnen, E.: *see* Chen, C.-S.
Ku, Y. H. and L. P. Sheporaitis: Global properties of diffusion processes on cylindrical type phase space, 93
Kuo, M. C. Y.: Differential games on function space, 411

L

Lombardo, C. J.: *see* Samaddar, S. N.

M

Mahalanabis, A. K.: *see* Bhaumik, H.
Masry, E.: Optimum prefiltering in randomly sampled data systems, 293
Mintz, M.: A recursive nonlinear predictor, 121
Mitra, S. K.: A matrix operation for analyzing series-parallel multiports, (BC), 167
Mostaghel, N. and J. L. Sackman: On the stability of Hill's equation, 147

O

Ohsumi, A.: *see* Sunahara, Y.

P

Parkin, E. S. and R. L. Zahradnik: Variational analysis of diffusion in a catalyst pore, 427
Protonotarios, E. N.: Application of the Fokker–Planck–Kolmogorov equation to the analysis of differential pulse code modulation systems, 31

R

Riaz, M.: Piecewise solutions of electrical networks with coupling elements, 1
Rubinstein, M. F., L. D. Hofmeister and L. P. Felton: Stability analysis by matrix decomposition, 433

S

Sackman, J. L.: *see* Mostaghel, N.
Samaddar, S. N. and C. J. Lombardo: Differential equation associated with electromagnetic waves in an inhomogeneous medium where $\nabla\varepsilon(\mathbf{r})\cdot\mathbf{E}$ vanishes, 457
Schweitzer, S. and A. I. Soler: One-dimensional viscous magnetofluidynamic flow in an annulus, 445
Shen, C. S. and E. Kinnen: Construction of Liapunov functions, 133
Sheporaitis, L. P.: *see* Ku, Y. H.
Soler, A. I.: *see* Schweitzer, S.
Soong, T. T.: *see* Chuang, S. N.
Spingarn, K.: Some numerical aspects of optimal control, 351
Steffen, M. R. and W. Dent: Construction of redundant networks with minimum distance, 223
Sunahara, Y. and A. Ohsumi: An approximate method of stochastic terminal control for nonlinear dynamical systems, 205

T

Tabak, D.: Optimal control of nonlinear discrete time systems by mathematical programming, 111

W

Wang, A. S. D.: A perturbation method as applied to problems of finite elastodynamic deformations, 361
Wang, H. S. C.: On Cauchy's interpolation formula and sampling theorems, (BC), 233
Wilkov, R. S. and W. H. Kim: A practical approach to the chromatic partition problem, 333
Wolf, A. A.: Measurement error of short-term correlation functions of ergodic processes, 469
Wolf, A. A.: Thermodynamic properties and superconductivity of Ohmic materials, 193

Z

Zahradnik, R. L.: *see* Parkin, E. S.

VOL.
289
1970